

# Bestätigung der Autoren-Metadaten/ Author Metadata Approval Sheet

Sehr geehrte Autoren,

Bitte prüfen Sie die unten aufgeführten Autoren-Metadaten sorgfältig und ergänzen bzw. korrigieren Sie diese ggf. in der beschreibbaren rechten Spalte.

Vielen Dank für Ihre Mitarbeit, De Gruyter

Dear author,

Please check and complete carefully the author metadata listed below by using the editable fields in the right column.

Thanks for your kind cooperation, De Gruyter

**Journal-Name:** European Journal of Applied Linguistics

**Article-DOI:** 10.1515/eujal-2017-0006

**Article-Title:** Pluriliteracies Teaching for Learning: conceptualizing progression for deeper learning in literacies development

Bitte vervollständigen/ Please complete	Author Meta Data	Bitte ändern/To be changed
	<b>Author 1</b>	
	<b>Surname</b> Meyer	
	<b>First Name</b> Oliver	
	<b>E-Mail</b> omeyer@uni-mainz.de	
	<b>Corresponding</b> yes	
	<b>Affiliation 1</b> Universitätsprofessor, Fachdidaktik des Englischen, Johannes Gutenberg-Universität, Jakob-Welder-Weg 18, D-55128 Mainz	
	<b>Institution 1</b> Universities of Mainz	
	<b>Department 1</b> Fachdidaktik des Englischen	
	<b>City 1</b> D-55128 Mainz	
	<b>Country 1</b> Germany	

Bitte vervollständigen/ Please complete	Author Meta Data	Bitte ändern/To be changed
	<b>Author 2</b>	
	<b>Surname</b>	Coyle
	<b>First Name</b>	Do
	<b>E-Mail</b>	do.coyle@abdn.ac.uk
	<b>Corresponding</b>	no
	<b>Affiliation 1</b>	Sixth Century Chair in Learning Innovation, MacRobert Building, King's College, Aberdeen, AB24 5UA
	<b>Institution 1</b>	University of Aberdeen
	<b>Department 1</b>	Sixth Century Chair in Learning Innovation
	<b>City 1</b>	Aberdeen
	<b>Country 1</b>	United Kingdom of Great Britain and Northern Ireland

Data checked and receipted

Date: \_\_\_\_\_

Oliver Meyer\* and Do Coyle

# Pluriliteracies Teaching for Learning: conceptualizing progression for deeper learning in literacies development

<https://doi.org/10.1515/eujal-2017-0006>

**Abstract:** Pluriliteracies Teaching for Learning (PTL) constitutes a relatively recent development in *Content and Language Integrated Learning* (CLIL). This approach has been developed by a group of international experts (The Graz Group) in order to model and provide pathways for deeper learning across languages, disciplines and cultures by focusing on the development of disciplinary or subject specific literacies. We argue that deeper learning – defined as the successful internalization of conceptual content knowledge and the automatization of subject specific procedures, skills and strategies – rests on learners' acquisition of disciplinary literacies. We posit that disciplinary literacies in turn only develop when learners actively engage in subject specific ways of constructing knowledge and when they are taught how to language their understanding appropriately and in an increasingly complex and subject appropriate manner. In this article, we will describe the theoretical underpinnings that inform our model to show how an understanding of the two key processes of deeper learning will aid to the conceptualization of learner progression in pluriliteracies development.

**Zusammenfassung:** Pluriliterales Lernen ist ein neuer didaktisch-methodischer Ansatz für den bilingualen Unterricht. Dieses Konzept wurde von einer internationalen Expertengruppe entwickelt (Graz Group), um vertiefte Lernprozesse über Sprachen- und Fächergrenzen hinweg zu initiieren. Vertieftes Lernen beinhaltet sowohl die Internalisierung von Konzeptwissen als auch die Automatisierung von Fertigkeiten und Strategien und führt zur Entwicklung von Sachfachliteralität. Die Entwicklung von Sachfachliteralität ist an fachspezifische Methoden der Wissenskonstruktion und -kommunikation gekoppelt. Pluriliterales Lernen fördert die Sachfachliteralität in mehreren Sprachen und befähigt Lerner, ihr Wissen

---

**\*Corresponding author: Oliver Meyer**, Universitätsprofessor, Fachdidaktik des Englischen, Johannes Gutenberg-Universität, Jakob-Welder-Weg 18, D-55128 Mainz, E-Mail: [omeyer@uni-mainz.de](mailto:omeyer@uni-mainz.de)

**Do Coyle**, Sixth Century Chair in Learning Innovation, MacRobert Building, King's College, Aberdeen, AB24 5UA, E-Mail: [do.coyle@abdn.ac.uk](mailto:do.coyle@abdn.ac.uk)

adäquat zu versprachlichen und sich an zunehmend komplexen Fachdiskursen erfolgreich zu beteiligen. In diesem Artikel sollen die Prozesse und Theorien, die unserem Ansatz zugrunde liegen, vorgestellt und näher erläutert werden um zu zeigen, wie sich sachfachliche Lernprogressionen denken, entwickeln und erforschen lassen.

## Introduction

The Pluriliteracies Approach to Teaching for Learning is an ongoing development that attempts to address a number of conceptual shortcomings in Content and Language Integrated Learning (CLIL) as identified by practitioners, curriculum planner and researchers. In particular, there are wide variations in the meaning and nature of integration (Nikula et al. 2016) and its conceptual and practical implications for CLIL, which we believe result in:

- deficits in academic language use, in the knowledge and mastery of academic forms of communication and of writing in particular (Vollmer 2008)
- a notable absence of cognitive discourse functions in CLIL classrooms such as ‘defining’, ‘explaining’, ‘hypothesising’ or ‘predicting’ (Dalton-Puffer 2007, 2015)

We have argued before that findings such as these strongly suggest that adopting a CLIL approach does not automatically lead to effective learning and increased subject-specific performance. Moreover, we propose that a general lack of awareness and subsequent limited focus on academic literacies may promote surface learning, “where new knowledge is arbitrarily and non-substantively incorporated into cognitive structure” (Novak 2002: 549). In these situations, it is believed that surface learning mitigates against deeper learning “where the learner chooses conscientiously to integrate new knowledge to knowledge that the learner already possesses” (ibid.) and which involves “substantive, non-arbitrary incorporations of concepts into cognitive structure” (ibid.) and may eventually lead to the development of transferable skills. Following Mohan (2010), Llinares, Morton & Whittaker (2012), and Rose & Martin (2012) our approach is based on a revised understanding of language and its role in learning where language is seen

... as a means for learning about the world. It models learning as a process of making meaning, and language learning as building one’s meaning potential to make meaning in particular contexts. Knowledge is viewed as meaning, a resource for understanding and acting on the world. (Mohan et al., 2010, p. 221)

Such a focus on meaning-making potential has far-reaching consequences not only for CLIL, but for learning in general, both on a conceptual as well as a practical level. It prioritises the development of subject specific literacies i.e. the ability to actively demonstrate and express understanding in a wide variety of subject specific modes, as fundamental for effective learning and as such a primary objective for education.

The Pluriliteracies Model maps learner progression along an idealized knowledge pathway into a discipline (Veel 1997). It illustrates how teachers can mentor the acquisition of subject specific literacies by empowering students to make connections between the conceptualizing continuum and the communicating continuum of learning. These connections are essential for individuals to become expert meaning makers in all dimensions of subject learning, i.e. taking science as an example “doing science”, “organizing science”, “explaining science” and “arguing science” and their associated genres (Coffin 2006, Polias 2016).

In this article, we would like to describe the theoretical underpinnings that inform our Pluriliteracies Model. First we will present a definition of deeper learning and show how that concept is related to the acquisition of subject specific literacies. Second, we will describe the two main processes that drive deeper learning, i.e. the internalisation of conceptual knowledge and the acquisition of relevant skills via automatization and practice. This will lead us to position learner strategies at the interface of teaching and learning which allows teachers to mentor and scaffold the process of literacies learning.

In the final section, we will briefly present the outline of an evolving, multi-dimensional construct of learner progression. This is based on a revised understanding of the theoretical underpinnings of deeper learning which will be discussed in the following sections of this article.

## I Situating Pluriliteracies Teaching for Learning

### I.1 Deeper Learning

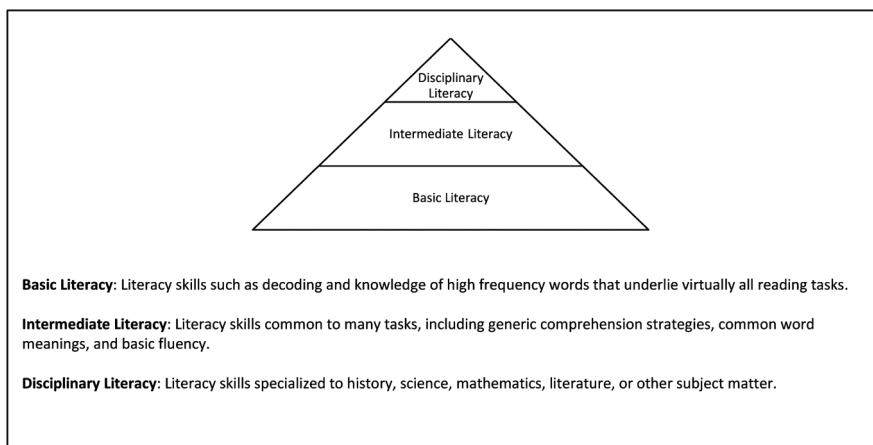
Deeper learning has been defined as “the process through which an individual becomes capable of taking what was learned in one situation and applying it to new situation (i.e. transfer)” (National Research Council (2012): SUM-4). After a comprehensive review of available research, Hilton and Pellegrino (2012) emphasize that the process of deeper learning and the resulting competencies are structured “around fundamental principles of the content area and their relationships, rather than disparate, superficial facts or procedures.” (ibid.) They conclude that transfer of learning, or, more specifically, “specific transfer of general

principles” (ibid. 4–3) is dependent on “the way in which the individual and the community structures and organizes the intertwined knowledge and skills.” (ibid. SUM-5)

In other words, it is through mastering subject specific ways of generating and communicating knowledge (i.e. subject specific literacies) that individuals develop transferable knowledge in what Hilton & Pellegrino have coined as 21<sup>st</sup> century skills and competencies. Therefore, for deeper learning to be successful, it has to be “situated within, and emerges from, the practices in different settings and communities [...] with their own cultures, languages, tools and modes of discourse” (ibid. 4–4). However, we would argue that while deeper learning and subject literacies are clearly interdependent, deeper learning will not be the automatic by-product of subject teaching and learning. Students will only successfully master subject specific literacies in an environment that focuses on building learners’ meaning-making potential by enabling them to actively demonstrate their understanding, primarily through the adequate use of appropriate language. This stance will be further explored.

## 1.2 Subject Specific Literacies

Recently, Shanahan and Shanahan (2008, 2012) have conceptualized literacy development as the process of moving from basic to intermediary to disciplinary literacies (figure 1).



**Figure 1:** The Increasing Specialization of Literacy Development (based on Shanahan & Shanahan 2008)

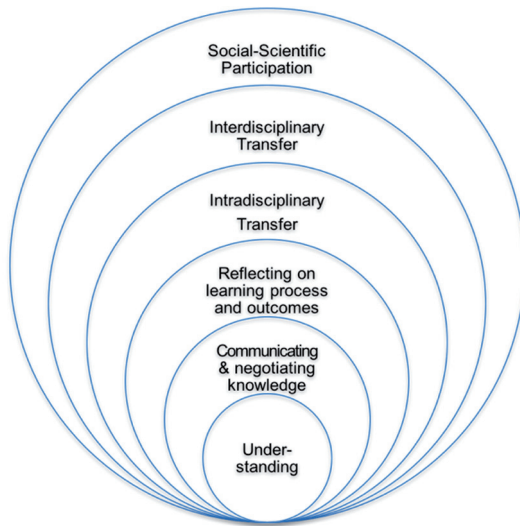
Like Hilton & Pellegrino (2012), Shanahan & Shanahan challenge the widely-held assumption that knowledge can be accessed and built through a set of generalized study skills, that learning any kind of text is quasi-independent of the underlying subject matter and that basic readings skills automatically evolve into more advanced skills. Instead, they make the case for teaching disciplinary literacies that address the profound differences in the language used to construct and communicate specific subject knowledge and in the ways different disciplines read and approach texts.

Work on disciplinary literacy is rapidly emerging, especially in the US (Dobbs et. al. 2016, Fang & Coatham 2013, Gillis 2014, Hetton & Shanahan 2012, Schleppegrell 2008, Weinburgh & Silva (2012). A similar focus on disciplinary literacy can also be observed in current European publications. Beacco et al. (2015) have taken the concept of scientific literacy and applied it to a school context arguing for a generalized notion of literacy for all subjects as an indicator of quality education in general (ibid. 26) and, more specifically, to describe the broader goals of subject discipline education. Scientific literacy, for example, has been defined as an

“evolving combination of the science-related attitudes, skills, and knowledge students need in order to develop inquiry, problem-solving, and decision-making abilities, to become lifelong learners, and to maintain a sense of wonder about the world around them.” (Council of Ministers of Education, Canada, 1997:4))

According to Beacco et al., subject literacy consists of six dimensions which are interdependent and build on one another (figure 2):

1. processing and acquiring subject knowledge and in-depth understanding of texts that deal with subject-matter issues.
2. negotiating the meaning of new knowledge items in relation to already existing ones.
3. Reflecting on how a new insight developed and was acquired.
4. Considering the validity and use of knowledge, applying it to other/new contexts.
5. Preparing for and participating in socio-scientific debates and the relevant discourses outside of school.
6. Questioning critically the meaning and scope of rules or conventions, generalizing the acquired procedural knowledge and skills (as part of one's general education). (Beacco et al. 2015: 27)



**Figure 2:** The six Dimensions of subject literacy (based on Beacco et al. 2015: 27); visual was created by the author

This raises the question of how progressions along knowledge pathways in the disciplines can be mapped in order to mentor learners' acquisition of subject specific literacies in all its six dimensions.

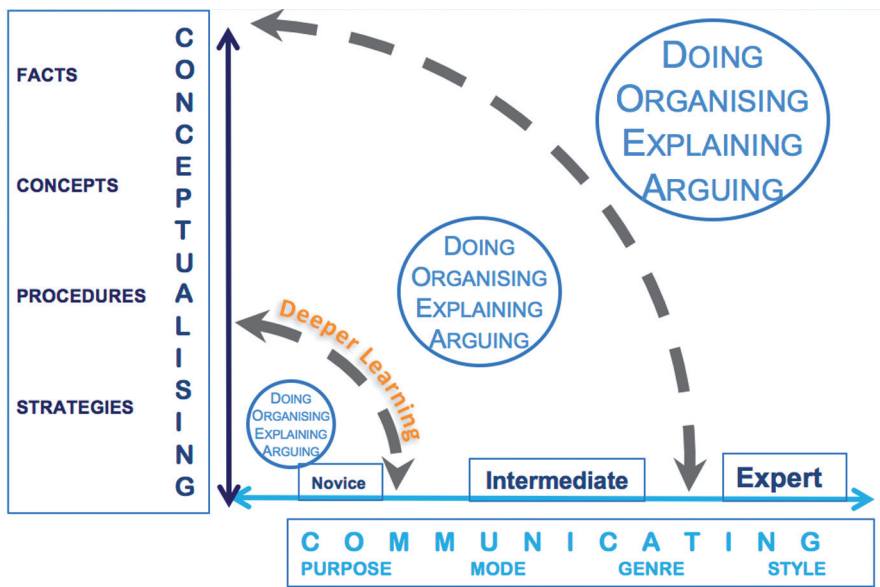
Building on the work of The New London Group (1996), Hornberger (2003), Garcia et al. (2007), the Graz Group has developed a Pluriliteracies Approach to Teaching for Learning which promotes subject literacy development in more than one language as a key to deeper learning and the development of transferable skills. This approach focuses on helping learners become literate in content subjects and to empower them to successfully and appropriately communicate that knowledge across disciplines, cultures and languages in a wide variety of modes in order to become creative and responsible global citizens (Meyer et al. 2015).

In the following, we posit that subject learning consists of two distinguishable but interrelated building blocks: knowledge building and knowledge sharing/communication. We believe that the most relevant process for the latter is the automatization of relevant skills via a wide range of balanced practice activities. The former is guided by the internalization of conceptual knowledge. Both processes are triggered by the use of learner strategies.



## II Theoretical underpinnings of literacies learning

### II.1 The Pluriliteracies Model



**Figure 3:** The Graz Group Pluriliteracies Model (Meyer et al. 2015)

Our model serves several purposes: First, it helps identify the main components of subject literacies as both knowledge construction as well as knowledge sharing (figure 3). In order to build knowledge, learners need to use strategies and skills to transform facts and observations into conceptual knowledge following subject specific procedures. To communicate their knowledge, learners have to successfully identify the purpose and their audience and make corresponding choices regarding mode, genre and style of their message. Second, our model stresses the need for learners to actively explore the connections between the two continua when engaging in the prototypical activities of knowledge building within a subject (i.e. doing science, organizing science, explaining science and arguing science). As has already been stated, in our model, deeper learning requires learners to create links between the conceptual and the communicative continuum in increasingly more sophisticated ways. In other words, progress becomes evident as novices increase their meaning-making potential by moving outwards along the continuum alongside an ability to verbalize their increasingly complex

conceptual understanding adequately in the appropriate language. This articulation demonstrates improved command of subject specific skills and strategies.

Consequently, to apprentice learners into the subjects of schooling, practitioners need to be familiar with the two key mechanism of deeper learning: skill acquisition and the internalization of conceptual knowledge both of which are governed by a wide array of learner strategies.

## II.2 Internalization of Conceptual Knowledge

Concepts are “perceived regularities in events or objects, or records of events or objects designated by a label” (Novak: 550). They are hierarchically structured and represent the building blocks of organized knowledge. Concepts are the foundation of propositions or units of meaning constructed in cognitive structure (figure 4):

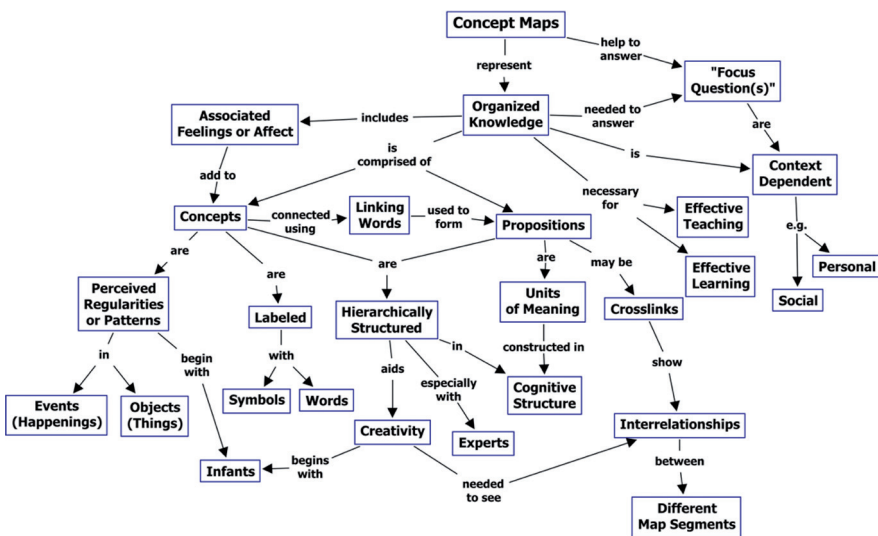
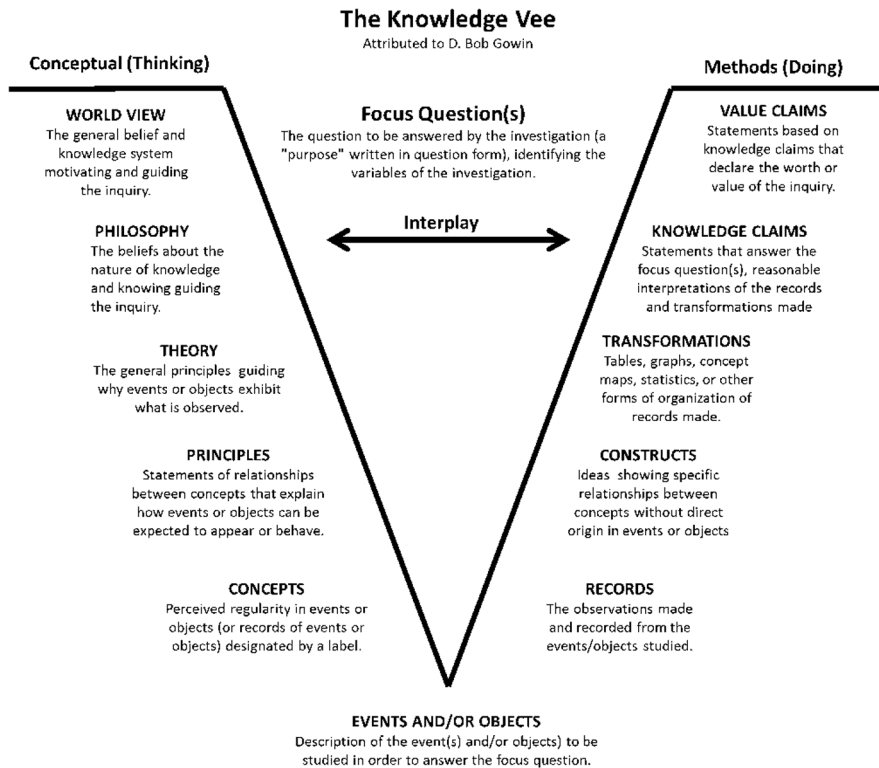


Figure 4: Concept map (taken from Novak 2002)

According to Novak, meaning-making proceeds, “when a new regularity is perceived [...] leading to concept formation and/or the construction of new propositions (ibid.: 550). There are a number of epistemological elements which all interact with each other throughout processes involved in constructing new knowledge or meanings (figure 5).



**Figure 5:** Gowin's Vee: The 12 epistemological elements operating in the construction of knowledge. <http://customerthink.com/the-focus-question/>

In a similar vein, Lantolf holds that “scientific concepts are the foundation of the process of developmental education... concepts are relevant for the formation of consciousness because they shape how we perceive, understand, and act in and on the world.” (Lantolf & Poehner 2014: 59). Understanding and knowing requires the successful internalization of conceptual knowledge which follows three phases from understanding to abstraction to transfer (Lantolf 2014).

Theories about the formation of conceptual knowledge have significantly impacted the development of our Pluriliteracies Model, our understanding of the nature of ‘content’, ‘language’ and how they are related to deeper learning. We propose that content learning first and foremost needs to be about furthering our learners’ conceptual understanding. Deeper learning requires the successful internalisation of conceptual knowledge. We posit that language, or more precisely, ‘linguaging’, “the process of making meaning and shaping knowledge and experi-

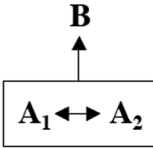
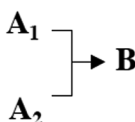
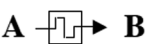

ence through language” (Swain: 2006) is the key to deeper learning because it mediates conceptual development.

### II.3 The role of language in the process of knowledge construction

In order to be able to inform practitioners how to teach their learners how to language their understanding, the exact nature of the interplay between language and thinking needs to be further specified. Following the theories and assumptions on conceptual development introduced so far, we would like to propose the following:

1. Concepts and propositions are cognitive patterns of varying complexity.
2. The shape of those patterns is determined by language which indicates how individual elements of a pattern are linked.
3. Analogous to the view of the mind as a constantly shifting system, these patterns aren’t static but meaningful and dynamic: “In nature’s pattern-forming systems, contents aren’t contained anywhere but are revealed only by the dynamics. Form and content are thus inextricably connected and can’t ever be separated” (Kelso 1995: 1).
4. Conceptual growth is the result of the complexification of the patterns underlying concepts and propositions.
5. “Learning new concepts or complex skills depends on practice, which creates specific neural wiring that supports schema or skills formation” (Jackson 2011: 96)

These considerations may help to clarify why functional linguists consider language to be the “primary evidence of learning” (Mohan 2010): language has the potential to make thinking and learning visible by revealing the level of conceptual understanding as reflected in the state/shape of the pattern used to express thinking/understanding (figure 6). Brown demonstrates how such an understanding of conceptual development can be used to develop a flexible model of cognition. His model is built on a continuum of understanding ranging from intuition to expertise where “learning is conceived as a progress toward higher levels of sophistication and competence as new knowledge is linked to existing knowledge and deeper understandings are developed (Brown 2011: 225).”

Level		Description of Person	Description of Response
<b>5</b> Emergent		The phenomenon is seen as an emergent property of a system, made up of interacting components. The system evolves over time, eventually producing the observed effect.	A <sub>1</sub> and A <sub>2</sub> happen. Over time, they interact and evolve, until eventually B happens. Meanwhile, A <sub>1</sub> and A <sub>2</sub> continue to happen.
<b>4</b> Multiple		The phenomenon is seen as an effect produced by multiple causal elements. All are necessary; if one is removed the effect is not produced.	A <sub>1</sub> and A <sub>2</sub> cause B when they both happen at the same time.
<b>3</b> Justified		The phenomenon is seen as an effect produced by a single causal element. Justification or a mechanism is necessary.	A causes B, and this is how.
<b>2</b> Elemental		The phenomenon is seen as an effect produced by a single causal element. Justification or a mechanism is not necessary.	A causes B.
<b>1</b> Acausal	<b>B</b>	The phenomenon is seen as an instantiation of reality. No cause is necessary.	B happens because that's the way things are.
<b>0</b> Absent	<b>B ???</b>	The phenomenon is surprising. No explanation seems possible.	I can't explain why B happens.

**Figure 6:** Brown, N. (2011): A Model of Cognition. The Missing Cornerstone of Assessment. 2011: 228)

In addition to making thinking and learning visible, a functional understanding of language offers another significant advantage: treating language as a ‘social semiotic’ (Coffin & Donohue: 2014). A ‘social semiotic’ can be explained as “a tool that enables conceptual development” (ibid.: 23), links language with the notion of social mediation, the process where teachers and learners employ semiotic tools to mediate meaning (ibid.). Therefore, language has a two-fold function in learning. First, it serves to make the learners’ understanding and thinking visible. Second, it represents the tool that allows teachers to mediate their learners’ thinking and understanding by reconfiguring their internal conceptual structures through pedagogic intervention and scaffolding. Analyzing these two fundamental functions of language further allows us to examine what lies at the interface

between thinking and language and the cognitive learning goals which are ever-present in classrooms. This brings us to linguistic representations of learning built on cognitive strategies or schemata that are intersubjectively constitutive of learning itself. These cognitive-linguistic functions have been coined cognitive discourse functions (CDFs).

We believe that the construct of cognitive discourse functions plays an essential role in both these processes and it has thus been placed at the heart of our model. Operating at the interface between thinking and language, CDFs serve as linguistic representations of cognitive learning goals and have been defined as

patterns which have crystallized in response to recurrent situative demands in a context where participants have recurrent purposes for communicating (cf. Dalton-Puffer 2007b: 202). In other words, they are patterns which have arisen from the demand that participants within the institution school orient towards explicit or implicit learning goals and the fact that they have the repeated need for communicating about ways of handling and acting upon curricular content, concepts, and facts (cf. cognitive process dimension of Anderson et al. 2001). It is their very nature to provide speakers with schemata (discoursal, lexical and grammatical) for coping with standard situations in dealing with the task of building knowledge and making it intersubjectively accessible. (Dalton Puffer 2014: 231)

Dalton-Puffer’s construct of Cognitive Discourse Functions consists of seven elements which can each be conceived as a category comprising several ‘members’ which differ both in size and scope (figure 7):

**Figure 7:** A construct of Cognitive Discourse Functions, Types, Intentions & Members (Dalton-Puffer: 2014)

CDF Type	Label	Communicative Intention	Members
1	Classify	I tell you how we can cut up the world according to certain ideas	classify , compare, contrast, match, structure, categorize, subsume
2	Define	I tell you about the extension of this object of specialist knowledge.	define, identify, characterize
3	Describe	I tell you details of what can be seen (also metaphorically)	Describe, label, identify, name, specify
4	Evaluate	I tell you what my positions is vis a vis X.	Evaluate, judge, argue, justify, take a stance, critique, recommend, comment, comment, reflect, appreciate
5	Explain	I give you reason for and tell you cause/of X.	Explain, reason, express cause/ effect, draw conclusions, deduce

CDF Type	Label	Communicative Intention	Members
6	Explore	I tell you something that is potential	Explore, hypothesize, speculate, predict, guess, estimate, simulate, take other perspectives
7	Report	I tell you about sth. external to our immediate context on which I have a legitimate knowledge claim.	Report, inform, recount, narrate, present, summarize, relate

While Dalton-Puffer herself concedes that due to the complex internal nature of the categories, the borders of the presented categories are ‘fuzzy’ and overlap, nonetheless, we put the construct of CDFs at the heart of our model for a number of reasons:

- First, CDFs allow for integrated planning of CLIL lessons by addressing cognitive operations as well as the linguistic functions relevant for processing content, and thereby conceptual understanding.

*Practical Example/Sample Task:*

- Define the term “osmosis”.
  - Name the causes that led to the financial crisis of 2008 and explain its effects on the global economy.
- Second, CDFs trigger specific languaging processes and therefore allocate learners an active role in the process of knowledge construction. At the same time, teachers are presented with valuable opportunities to formatively assess the level of student understanding by evaluating the conceptual complexity which becomes ‘visible’ and accessible in the learners’ demonstrations of understanding. CDFs can thus be considered as suitable planning tools for moving away from input to output-oriented curricula.
- Third, CDFs offer a finer level of granularity than the large-scale notions of register and genre traditionally used by Systemic Functional Linguistics. In fact, we believe that CDFs can be understood as ‘micro genres’ which can be combined to “build” the larger genres representative of the various disciplines like a lab report, for instance. The process that turns ‘stand-alone’ genres into parts of larger genres has been referred to as ‘embedding’ (Coffin & Donohue 2014: 53).

*Practical Example:*

*In a chemistry unit, learners might initially focus on **describing** the setup of an experiment and **hypothesize** about the outcome of their experiment which may be conducted in the next lesson.*

*In a following, they might focus on **reporting** and **explaining** their findings before subsequently using their data to formulate a **definition** and embed those micro-genres into the larger genre of a lab-report.*

- Finally, the biggest advantage of our understanding of CDFs as both internal buildings blocks of cognitive structures as well as functional buildings blocks of more complex and larger genres, is that they allows teachers to match the conceptual complexity of any given content with the individual needs of their learners. This involves adapting both the underlying cognitive pattern as well as the linguistic complexity and style of the CDFs used to language that pattern. In our lego model (figure 8), which we have developed for teacher training courses and activities to visualize these very abstract concepts, this idea is analogous to moving from duplo to lego to technic or vice versa:

*Practical Example:*

- a) *In the chemistry unit outlined above, the teacher can scale the conceptual complexity of the new phenomenon (i.e. redox reactions) up or down and thus increase or decrease the level of difficulty, by*
  - *de- or increasing the complexity of the experiment,*
  - *by providing simple or more sophisticated patterns for the CDFs that make up the lab report and*
  - *by teaching learners simple or increasingly sophisticated ways of languaging those patterns*
  - *by raising or lowering the stylistical demands of the genre (i.e. in terms of the use of key terminology, nominalizations, passive voice, ways to link paragraphs etc.)*
  - *by de- or increasing the difficulty of summative assessment tasks that require the transfer of knowledge*
- b) *A history teacher can deepen a learner's understanding of the causes of WW II by helping the learner move from a sequential explanation pattern to a simple causal pattern, or from a simple causal pattern to a complex causal one, while providing the linguistic scaffolding (chunks in forms of phrases, frames etc.) to express that understanding appropriately.*

To sum up: CDFs play an instrumental role in knowledge construction because they contribute to the formation and strengthening of the mental patterns underlying the epistemological elements involved via the process of languaging. Figure 9 illustrates how CDFs are integral to the four activity domains (doing, organizing, explaining, arguing) of our pluriliteracies model because they bridge internal processes of knowledge construction with external processes of communicating that knowledge in appropriate ways through corresponding genres.












Genre Literacy Level	Micro-Level (i.e. explanation)	Conceptualizing ↔ & Communicating	Macro-Level (i.e. lab report)
Novice			
Intermediate			
Advanced			

Figure 8: Visualizing the role of CDFs in Pluriliteracies Development

Figure 9: Cognitive Discourse Functions, Knowledge and Activity Domains, Activators and Corresponding Genres (based on Dalton-Puffer 2015 and Polias 2016)

Knowledge & Activity Domain	Cognitive Dis-course Function	Activators (= Operatoren)	Corresponding Genres
Doing	Report	report, inform, recount, narrate, present, summarize, relate	-Experiments & Protocols -Lab Reports -Investigations -(Auto-) Biographical, Historical Recount Historical Report
	Describe	describe, label, identify, name, specify	-Descriptions -Comparisons
Organizing	Classify	classify, compare, contrast, match, structure, categorize, subsume	-Compositions -Classifications Historical Account
	Explain	explain, reason, express cause/effect, draw conclusions, deduce	-Temporal explanations -Factorial/consequential explanations
Explaining	Define	define, identify, characterize	-Theoretical explanations

Knowledge & Activity Domain	Cognitive Dis-course Function	Activators (= Operatoren)	Corresponding Genres
Arguing	Explore	explore, hypothesize, speculate, predict, guess, estimate, simulate, take other perspectives	-Arguments (analytical, persuasive) -Discussions
	Evaluate	evaluate, judge, argue, justify, take a stance, critique, recommend, comment, reflect, appreciate	

Returning to the position we took in 2.1., we believe that CDFs are the specific cognitive-linguistic tools that make thinking visible and thus allow teachers to mediate their learners’ thinking and understanding by reconfiguring their internal conceptual structures. This mediation involves pedagogic intervention/scaffolding in the form of instructed strategy use which we will describe in more detail in the following section.

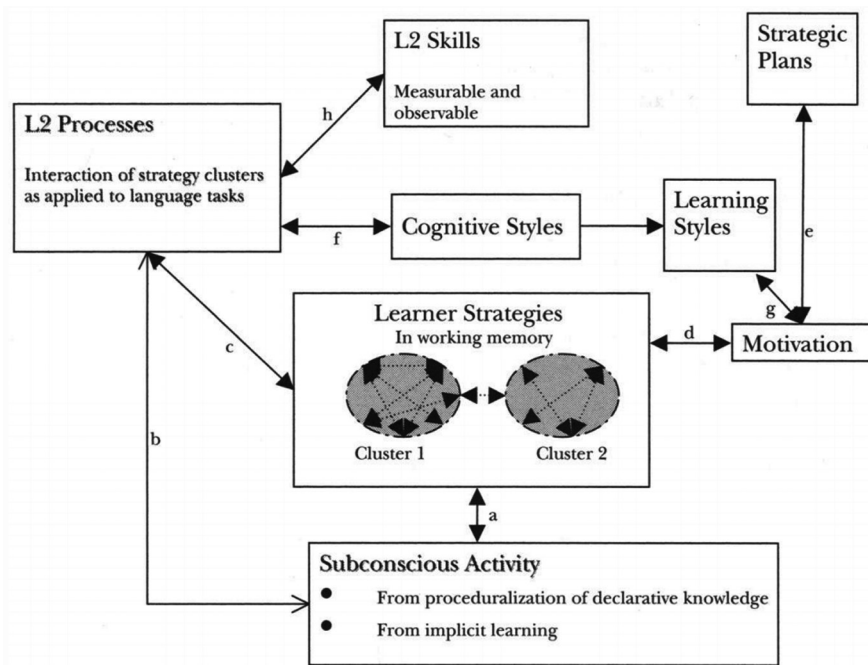
II.4 Learner Strategies

The question which strategies learners use while learning and using second languages has attracted a considerable amount of research since the late 1970s and led to parallel research efforts in language learner strategy instruction (see Hassan/Macaro et al. (2005) for a comprehensive review). Astonishingly, even though there are indications that strategy use affects language learning success and despite claims that learner strategies are key to learner autonomy and knowledge construction in content and integrated learning (Wolff: 2004), research on the effect of learner strategies on successful CLIL learning and performance is very sparse. There are only a few intervention studies (Azkarai & Agirre 2015, Jaekel: 2015, Lorenzo & Moore 2010, Meyer 2013; Ruiz de Zarobe & Zenotz 2015) published to date.

However, here seems to be a growing consensus that what is needed to assess the effect of instructed strategy use on learner performance is a reconceptualization of the construct of learner strategies not as traits but as techniques which can be taught and learned, and which are accessible to reflection and subsequent modification so that they can be used deliberately and purposefully and thus become learner strategies for individual learners (Schmenk 2009: 84/85).

Macaro’s revised theoretical framework (2006) is based on research from the fields of second language acquisition, cognitive psychology and neuroscience.

Disposing with many of the terminological and conceptual incongruences of earlier works in the field, the framework offers a plausible explanation for the interaction of learner strategies, underlying mental processes and language skills (Macaro 2006, Cohen & Macaro 2007, Macaro 2010):



**Figure 10:** A Cognitive Framework for Learner Strategies (Macaro 2006: 326)

According to Macaro, learners employ clusters of strategies to perform specific tasks. These strategies in turn trigger a variety of processes which become manifest in language skills. These processes can be automatized if those strategies have been evaluated by the learner and considered to be useful to them: "It may be that, through repeated practice and confirmation of effectiveness, a particular action Z becomes automatic in learning situation X." (329). We propose that these principles apply to any skill in any subject of schooling.

Another important aspect of the model is that strategies can be transferred to similar tasks through pattern matching procedures. Moreover, Macaro proposes that strategies can still become subject to modification after they have been automatized and that the successful development of skills is the complex relationship between processes, skills and strategies:

The automatisisation of strategies, through the continual deployment of clusters of strategies during L2 processes, leads to the development of skillful behaviour. In the field of L2 acquisition, as in the field of experimental psychology, skills increase their efficiency the more their underlying cognitive processes become proceduralised.” (ibid.: 331)

With regards to the development of subject-specific literacies, we propose that it is primarily through subject-specific strategies that learners develop subject specific skills and thus literacies. This suggests identifying instructed strategy-use as a key variable for teaching and lesson/materials design because the cognitive processes underlying the targeted skills can be proceduralised through a wide range of carefully balanced subject-specific tasks and practice activities

## II.5 Practice: key to the automatization of relevant skills

Anderson’s Adaptive Control of Thought (ACT, Anderson 1983) considers skill acquisition to be the result of the proceduralization or automatization of rule-bound declarative knowledge through practice and feedback. Successful strategy instruction, has to prioritize the automatization of the processes underlying the target skills which, as has been argued earlier (Macaro 2006, Meyer 2013), are triggered by the use of learner strategies. In order to help learners automatize those processes, teachers need to “set up contexts in which these skills can be displayed, monitored, and appropriate feedback given to the shape of their acquisition (Anderson et al. 1995: 71). Additionally, they need to “incorporate activities that promote automaticity into the language learning situation in a manner that respects transfer-appropriate processing”. (Segalowitz 2003: 402). In other words, teachers need to provide ample opportunities for learners to practice the use of specific strategies in order to develop the desired skills.

However, practice is a fairly complex issue and the successful automatization of skills is further complicated by the assumption of the existence of a dual-coding-system that language learners tap into for language production: an analytic rule-based system and a memory-driven exemplar-based system (Skehan 1998, Lyster 2007). Both systems feed on different types of practice: *controlled practice activities* or exercises on the one hand are cognitively undemanding and context-reduced and engage the learner’s awareness of rule-based representations. *Communicative practice activities* on the other hand are rich in context and engage learners in more open-ended and meaning-focused tasks (Lyster 2007).

So, to help learners develop a certain skill or skill-set, teachers need to offer their learners a carefully balanced array of activities and tasks which promote the automatization of the processes underlying the use a certain strategy:

- 1) Learners need to be taught when and how to apply a certain subject specific strategy in a specific context or to do successfully complete a given task. Awareness-raising or noticing activities coupled with controlled practice activities serve to strengthen the rule-based system (Lyster 2007).
- 2) Communicative practice activities, i.e. tasks that require the application of the desired strategies in authentic contexts serve to strengthen the memory-based system and will promote the quick retrieval of the linguistic components of a strategy through the process of chunking. DeKeyser 2008:292).
- 3) Instructed strategy use appears to be especially effective in promoting successful learning if it is carried out over lengthy periods of time and it includes a focus on metacognition (Hassen et. al. 2005, Macaro 2006). In other words, learners need opportunities to critically reflect on their individual strategy use and receive feedback that supports the automatisisation of the target features.

### **III Towards a multidimensional construct of deeper learner progression in pluriliteracies teaching for learning**

The Pluriliteracies model postulates that progression in learning rests on the successful activation of two key processes: the internalization of conceptual knowledge and the automatization of relevant skills. Our model not only lists the key components of successful knowledge construction and knowledge sharing but also envisions a pedagogic space where meaning-making can occur. The model goes further by detailing how meaning-making potential can be systematically built and increased within that space to help learners advance from literacies novices to experts. Accordingly, progress in pluriliteracies encompasses an increase in content knowledge as well as a growing command of subject specific procedures, skills and strategies to develop a deeper conceptual understanding of the specific contents of the subject.

Since learning cannot be separated from language, progress manifests itself in the learner's ability to communicate knowledge and demonstrate understanding. This understanding becomes visible in the ability to extract information from increasingly complex texts in all relevant modes. It shows in the breadth of obligatory and optional genre moves and in depth of conceptual understanding expressed in those moves. Progression also becomes visible in the quality of language used by individuals at a number of levels (discourse, sentence, lexicogrammatical) in line with genre expectations. Progression further becomes man-

ifest in a growing command of subject specific modes (charts, maps, tables, formulas, drawings, etc.) in both analogue and digital as well as hybrid forms. Additionally, progression in literacies should be accompanied by a growing (disciplinary) cultural awareness which is a prerequisite to successfully communicating knowledge across subjects, cultures and languages. Finally, learner progression must entail the learner's growing ability to critically reflect and thus self-direct his/her own learning process.

Summing up, it is becoming increasingly clear that progression in literacies learning occurs in and across several dimensions and on several levels simultaneously (such as conceptual depth and breadth, fluency, accuracy and complexity). Progression entails a vast number of knowledge elements; it is non-linear and the complex product of many interrelated components or factors. In recent publications (i.e. Rumlich 2016) existing CLIL research has been criticized for a number of reasons and there still seems to be uncertainty among both practitioners and researchers on how to fully exploit the potential of CLIL. We believe that this uncertainty also stems from several inherent critical flaws within the very construct of CLIL: not only have its key components such as 'content', 'language' and 'integration' not been adequately defined; there is still no convincing argument for teaching and learning subjects in and through an additional language, especially from a subject point of view. Also, the idea of learner progression has not been addressed so far.

The Pluriliteracies model was developed to address some of those flaws. We believe that situating CLIL within a deeper learning paradigm focusing on the development of pluriliteracies can give CLIL the focus and direction it has been lacking so far. A concise description of the elements on the conceptualizing and communicating continuum and the complex interplay of those individual components allows for a deeper understanding of the nature and purpose of integrating language and content. This understanding in turn can help practitioners develop suitable pedagogic approaches and practices to mentor literacies progress in their learners.

However, this requires a revised understanding of learning and learning progression which does justice to the complexity of the interplay of the individual components. Borrowing from an Emergent Cognition Framework we believe that learning can best be described as "dynamic, multi-scale process in which interactions-as- parts cause/effect new and qualitatively different wholes that include but transcend the parts themselves." (Emergent Cognition Project 2016, n.p.). And because of its emergent nature, learning does not follow a strictly linear view of causality but instead involves

a type of cause and effect that happens synchronously but at different levels. These levels differentiate between the scale of the parts and the scale of the whole. Although we may only perceive the resulting changes over time, the causes and their effects aren't related through time, they're related through scale / space / size. What happens at the smaller scale of the parts (A) simultaneously causes something to come into being on the bigger scale of the whole (B). (ibid.)

We believe that taking such a dynamic, ecological yet detailed and intricate stance on learning is an important step to develop effective pedagogic practices and appropriate complex research designs to validate their theoretical underpinnings and to measure their impact.

## Bibliography

- Anderson, John R. 1983. A Spreading Activation Theory of Memory. *Journal of Verbal Learning and Verbal Behavior* 22. 261–295.
- Anderson, John R., Albert Corbett & Ray Pelletier. 1995. Cognitive Tutors: Lessons Learned. *Journal of Learning Sciences* 4. 167–207.
- Azkarai, Agurtzane & Ainara Imaz Agirre. 2015. Negotiation of Meaning Strategies in Child EFL Mainstream and CLIL Settings. *TESOL Quarterly*. 1–27.
- Beacco, Jean-Claude, Mike Fleming, Francis Goullier, Eike Thürmann & Helmut Vollmer. 2015. The Language Dimension in all Subjects. *A Handbook for Curriculum Development and Teacher Training*. Council of Europe: [www.coe.int/t/dg4/linguistic/Source/Handbook-Scol\\_final\\_EN.pdf](http://www.coe.int/t/dg4/linguistic/Source/Handbook-Scol_final_EN.pdf)
- Brown, Nathaniel J. S. & Mark Wilson. 2011. A Model of Cognition: The Missing Cornerstone of Assessment. *Educational Psychology Review* 23(2). 221–234.
- Cazden, Courtney, Bill Cope, Norman Fairclough, James Gee, Mary Kalantzis, Gunther Kress, Allan Luke, Carmen Luke, Sarah Michaels & Martin Nakata (New London Group). 1996. A Pedagogy of Multiliteracies: Designing Social Futures. *Harvard Educational Review* 66(1). 60–92.
- Coetzee-Lachmann, Debbie. 2007. *Assessment of Subject-Specific Task Performance of Bilingual Geography Learners: Analysing Aspects of Subject-Specific Written Discourse*. Osnabrück: Universität Osnabrück dissertation.
- Coffin, Caroline. 2006. Mapping Subject-Specific Literacies. *National Association for Language Development in the Curriculum Quarterly* 3(3). 13–26.
- Coffin, Caroline & Jim Donohue. 2014. *A Language as Social Semiotic-Based Approach to Teaching and Learning in Higher Education* (Language Learning Monograph Series). Mary J. Schleppegrell (ed.). Hoboken, NJ: Wiley-Blackwell.
- Cohen, Andrew. D. & Ernesto Macaro. 2007. *Language Learner Strategies: Thirty Years of Research and Practice*. London: Oxford UP.
- Council of Ministers of Education, Canada (CMEC). 1997. Common Framework of Science Learning Outcomes K to 12: Pan-Canadian Protocol for Collaboration on School Curriculum for Use by Curriculum Developers. Toronto, ON.
- Dager, Joseph. 2013. The Focus Question. *Customer Think*, blogpost on Bob Gowin's Knowledge Vee: <http://customerthink.com/the-focus-question/>

- Dalton-Puffer, Christiane. 2007. *Discourse in Content and Language Integrated Learning (CLIL) Classrooms*. Philadelphia: John Benjamins.
- Dalton-Puffer, Christiane. 2014. A Construct of Cognitive Discourse Functions for Conceptualising Content-Language Integration in CLIL and Multilingual Education. *European Journal of Applied Linguistics* 1(2). 216–253.
- Dalton-Puffer, Christiane. 2015. Cognitive Discourse Functions: combining content and language perspectives for CLIL teacher development. Conference Presentation. CLIL Colloquium: Integrating Content and language for teacher development in bilingual/multilingual setting: From research to practice. Madrid: 10.06.2015.
- DeKeyser, Robert. 2007. *Practice in a Second Language: Perspectives from Applied Linguistics and Cognitive Psychology*. New York: Cambridge University Press.
- Dobbs, Christina. L., Jacy Ippolito & Megin Charner-Laird. 2016. Layering Intermediate and Disciplinary Literacy Work: Lessons Learned From a Secondary Social Studies Teacher Team. *Journal of Adolescent and Adult Literacy* 60(2). 131–139.
- Emergent Cognition Project (2016): Emergence of Mind. <https://eoaproject.wordpress.com/category/sections/emergent-systems-framework/levels-of-interaction/>
- Emergent Cognition Project (2016): Emergent Systems Perspective. <https://eoaproject.wordpress.com/2016/07/04/emergent-systems-perspective-4-of-5/>
- Fang, Zhihui & Suzanne Coatoam. 2013. Disciplinary Literacy: What You Want to Know About it. *Journal of Adolescent & Adult Literacy* 56(8). 627–632.
- García, Ofelia, Lesley Bartlett & Jo Anne Kleifgen. 2007. From Biliteracy to Pluriliteracies. In P. Auer & Li Wei (eds.), *Handbook of Applied Linguistics*, vol. 5: *Multilingualism*, 207–228. Berlin: Mouton-De Gruyter.
- Gillis, Victoria. 2014. Disciplinary Literacy: Adapt Not Adopt. *Journal of Adolescent & Adult Literacy* 57(8). 614–623.
- Hassen, Xavière, Ernesto Macaro, Deborah Mason, Gail Nye, Pete Smith & Robert Vanderplank. 2005. *Strategy Training in Language Learning – A Systematic Review of Available Research*. EPPI-Centre, Social Science Research Unit. University of London: Institute of Education.
- Hornberger, Nancy H. 2003. *Continua of Biliteracy: An Ecological Framework for Educational Policy, Research and Practice in Multilingual Settings*. Clevedon: Multilingual Matters.
- Jackson, Yvette. 2011. *The Pedagogy of Confidence – Inspiring High Intellectual Performance in Urban Schools*. New York: Teachers College Press.
- Jaekel, Nils. 2015. *Use and Impact of Language Learning Strategies on Language Proficiency: Investigating the Impact of Individual Difference Variables and Participation in CLIL Streams*. Bochum: Ruhr-Universität Bochum dissertation.
- Jetton, Tamara L. & Cynthia Shanahan (eds.). 2012. *Adolescent Literacy in the Academic Disciplines: General Principles and Practical Strategies*. New York, NY: Guilford.
- Kelso, J. A. Scott. 1995. *Dynamic Patterns: The Self-Organization of Brain and Behavior* (Complex Adaptive Systems). Cambridge: MIT UP.
- Lantolf, James P. & Matthew E. Poehner. 2014. *Sociocultural Theory and the Pedagogical Imperative in L2 Education: Vygotskian Praxis and the Research/Practice Divide*. New York: Routledge.
- Llinares, Ana, Tom Morton & Rachel Whittaker. 2012. *The Roles of Languages in CLIL*. Cambridge: Cambridge University Press.
- Lorenzo, Francisco, Sonia Casal & Pat Moore. 2010. The Effects of Content and Language Integrated Learning in European Education: Key Findings from the Andalusian Bilingual Sections Evaluation Project. *Applied Linguistics* 31(3). 418–442.



- Lyster, Roy. 2007. *Learning and Teaching Languages through Content: A Counterbalanced Approach*. Philadelphia: John Benjamins.
- Macaro, Ernesto. 2006. Strategies for Language Learning and for Language Use: Revising the Theoretical Framework. *The Modern Language Journal* 90(3). 320–337.
- Macaro, Ernesto (ed.). 2010. *The Continuum Companion to Second Language Acquisition*. London: Continuum.
- Meyer, Oliver. 2013. *Zum Zusammenhang von fertigungsorientierten Lernstrategien und sprachlicher Performanz am Beispiel der Bildbeschreibung im erweiterten Englischunterricht*. Eichstätt: Katholische Universität Eichstätt-Ingolstadt dissertation (unpublished).
- Meyer, Oliver, Do Coyle, Ana Halbach, Kevin Schuck & Teresa Ting. 2015. A Pluriliteracies Approach to Content and Language Integrated Learning – Mapping Learner Progressions in Knowledge Construction and Meaning-Making. *Language, Culture, and Curriculum* 28(1). 41–57.
- Meyer, Oliver, Do Coyle & Ana Halbach. 2015. *A Pluriliteracies Approach to Teaching for Learning – Putting a Pluriliteracies Approach into Practice*. European Centre for Modern Languages: <http://pluriliteracies.ecml.at/Portals/4/publications/pluriliteracies-Putting-a-pluriliteracies-approach-into-practice.pdf>
- Mohan, Bernard, Constant Leung & Tammy Slater. 2010. Assessing Language and Content: A Functional Perspective. In Amos Paran & Lies Sercu (eds.), *Testing the Untestable in Language Education*, 217–240. Clevedon: Multilingual Matters.
- National Research Council. 2012. *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century*. Committee on Defining Deeper Learning and 21st Century Skills, James W. Pellegrino and Margaret L. Hilton, (eds.). Board on Testing and Assessment and Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.
- Novak, Joseph D. 2002. Meaningful Learning: The Essential Factor for Conceptual Change in Limited or Inappropriate Propositional Hierarchies Leading to Empowerment of Learners. *Science Education* 86. 548–571.
- Polias, John. 2016. *Apprenticing Students into Science: Doing, Talking, and Writing Scientifically*. Melbourne: Lexis Education.
- Rose, David & Jim Martin. 2012. *Learning to Write, Reading to Learn: Genre, Knowledge and Pedagogy in the Sydney School*. Sheffield: Equinox.
- Ruiz de Zarobe, Yolanda & Jasone Cenoz. 2015. Way Forward in the Twenty-First Century in Content-Based Instruction: Moving Towards Integration. *Language, Culture and Curriculum* 28(1). 90–96.
- Rumlich, D. (2016). Evaluating bilingual education in Germany: CLIL students' general English proficiency, EFL self-concept and interest. Frankfurt am Main: Lang.
- Schleppegrell, Mary J., Stacey Greer & Sarah Taylor. 2008. Literacy in History: Language and Meaning. *Australian Journal of Language and Literacy* 31(2). 174–187.
- Schmenk, Barbara. 2009. Kulturelle und soziale Aspekte von Lernstrategien und individuellem Strategiegebrauch. *Fremdsprachen Lehren und Lernen* 38. 70–88.
- Segalowitz, Norman. 2003. Automaticity and Second Languages. In Catherine J. Doughty & Michael H. Long (eds.), *The Handbook of Second Language Acquisition*, 368–408. Malden, MA: Blackwell.
- Shanahan, Timothy & Cynthia Shanahan. 2008. Teaching Disciplinary Literacy to Adolescents: Rethinking Content-Area Literacy. *Harvard Educational Review* 78(1). 40–59.

- Shanahan, Timothy & Cynthia Shanahan. 2012. What Is Disciplinary Literacy and Why Does It Matter? *Topics in Language Disorders* 32(1). 7–18.
- Skehan, Peter. 1998. *A Cognitive Approach to Language Learning*. London: Oxford UP.
- Swain, Merrill. 2006. Linguaging, Agency and Collaboration in Advanced Language Proficiency. In Heidi Byrnes (ed.), *Advanced Language Learning: The Contribution of Halliday and Vygotsky*, 95–108. London: Continuum.
- Veel, Robert. 1997. Learning How to Mean – Scientifically Speaking: Apprenticeship into Scientific Discourse in the Secondary School. In Frances Christie & James R. Martin (eds.), *Genre and Institutions. Social Processes in the Workplace and School*, 161–195. London: Continuum.
- Vollmer, Helmut Johannes. 2008. Constructing Tasks for Content and Language Integrated Learning and Assessment. In Odile Eckerth & Sabine Siekmann (eds.), *Task-Based Language Learning and Teaching – Theoretical, Methodological, and Pedagogical Perspectives* (Duisburger Arbeiten zur Sprach- und Kulturwissenschaft), 227–290. Frankfurt am Main: Peter Lang.
- Weinburgh, Molly H. & Cecelia Silva. 2012. An Instructional Theory for English Language Learners: The 5R Model for Enhancing Academic Language Development in Inquiry-Based Science. In Beverly J. Irby, Genevieve Brown, Rafael Lara-Alecio (eds.) & Jonice Koch (Sect. ed.), *Handbook of Educational Theories*, 293–304. Charlotte, NC: Information Age.
- Wolff, Dieter. 2004. Bilingualer Sachfachunterricht und Lernerautonomie. In Werner Altmann (ed.), *Bilingualer Unterricht in Deutschland und Spanien: Aktuelle Situation und methodische Ansätze*, 112–128. Berlin: Walter Frey.